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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/694,782	10/24/2000	Donald Francis Specht	18180.0016	8581

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EXAMINER

LE, BRIAN Q

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 10/08/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/694,782

Applicant(s)

SPECHT ET AL.

Examiner

Brian Q Le

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Loce U.S. Patent No. 6,438,273.

Regarding to claim 1, Loce teaches a method of increasing the sharpness (increase resolution) of a source image (Abstract) based on at least on auxiliary, co-registered image of a higher degree of sharpness (template has higher degree of sharpness or better resolution) (column 7, lines 1-9) wherein the source and auxiliary images comprise a plurality of pixels with corresponding spectral intensities, and wherein the spectral intensities of co-located pixels in the source (column 2, lines 14-19) and one or more auxiliary images define an intensity vector (FIG. 9 and FIG. 11) for each co-located pixel (when a vector stores pixel's data, it is inherent that it would store intensity data of that pixel too) (column 10, lines 6-15), comprising:

Resampling (sampling) the source and the auxiliary image to a common (FIG. 3 and column 8, lines 1-12), lower resolution.

Determining for each source image pixel a gain relating a differential change in intensity in the source image pixel with a differential change in intensity (change in resolution) of a corresponding auxiliary image pixel (column 7, lines 10-15 and column 12, lines 5-12), based on the common, lower resolution;

Deriving a mapping function (column 10, lines 20-28 and table 1) correlating determined gains with corresponding intensity vectors;

Subdividing each pixel of the original source image into a plurality of small pixels (FIG. 6), each small pixel of the original source image corresponding in size and location to a small pixel (FIG. 7) in the auxiliary image (In order to compare with templates, the size and location of input image must be correspond with the template/auxiliary image); and

Modifying the intensity of each subdivided source pixel based on differences in intensities (column 12, lines 5-12) between the small and large pixels in the auxiliary image and an interpolated (calculation of all possible values) gain from the mapping function (column 12, lines 35-44).

For claim 2, Loce further teaches the method wherein each of the large source pixels is subdivided into $N \times M$ pixels in the subdividing step (FIG. 6).

Referring to claim 3, Loce discloses the method wherein N is equal to M (FIG. 6, "Window Section").

As for claim 4, Loce further discloses the method wherein N is not equal to M (FIG. 6, "Desired Output Image").

Referring to claim 5, Loce teaches the method wherein the intensity vector includes at least two spectral intensities for each pixel (multiple bit contains more than two spectral intensity) (column 9, lines 9-10).

Regarding claim 6, Loce also teaches the method wherein the deriving step includes creating a codebook relating intensity vectors to at least one corresponding gain value (as disclosed in claim 1) based on the determining step (FIG. 11).

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For claim 7, Loce shows the method wherein the creating is performed according to vector quantization (column 12, lines 40-45 and column 10, lines 50-60).

Regarding claim 11, Loce teaches the method wherein the determining, deriving, subdividing and modifying steps are performed based on a plurality of co-located auxiliary images (FIG. 13).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loce U.S. Patent No. 6,438,273 as applied to claim 6 above, and further in view of Aleksic U.S. Patent No. 6,317,525.

Regarding claim 8, Loce does not disclose a concept of weighted average of the gain value of pixel intensity. Aleksic teaches a method of enhance the spatial resolution applying the weighted average of the value of pixel intensity (the weighted average of the gain value of the pixel intensity) (column 5, line 67 and column 6, lines 1-8). Modifying Loce's method of enhancing the resolution of the image according to Aleksic would able to compute the average resolution of the displayed pixels. This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Loci according to Aleksic.

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5. Claim 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loce U.S. Patent No. 6,438,273 as applied to claim 6 above, and further in view of Miceli U.S. Patent No. 6,522,284.

Regarding to claim 9, Loce does not teach a neural network has node centers. However, Miceli teaches a method of improving the resolution of the system (column 7, lines 45-67) that has a neural network comprises node centers (column 12, lines 35-53). Modifying Loce's method of enhancing the resolution of the image according to Miceli would able to improve the communication capability of the image resolution enhancement system. This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Loci according to Miceli.

For claim 10, Miceli further teaches a probabilistic neural network (column 5, lines 15-25 and column 10, lines 55-67).

CONCLUSION

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to image resolution enhancement:

U.S. Pat. No. 6,567,119 to Parulski, teaches digital image system and file format for storage and selective transmission of processed and unprocessed image data.

U.S. Pat. No. 5,450,502 to Eschbach, teaches image-dependent luminance enhancement.

U.S. Pat. No. 6,496,608 to Chui, teaches image data interpolation system and method.

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U.S. Pat. No. 5,226,094 to Eschbach, teaches method for making image conversion with error diffusion.

U.S. Pat. No. 5,717,789 to Anderson, teaches image enhancement by non-linear extrapolation in frequency space.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q Le whose telephone number is 703-305-5083. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC Customer Service whose telephone number is 703-306-0377.

BL
September 22, 2003



SAMIR AHMED
PRIMARY EXAMINER